

WHAT IS CLAIMED IS:

1 1. A process for producing a reaction bonded silicon carbide body, the
2 process comprising:
3 combining a carbon source, silicon carbide, an organic gelation agent and a
4 liquid to form a ceramic slurry;
5 compacting the ceramic slurry into a green body; and
6 exposing the green body to liquid silicon metal to produce a reaction bonded
7 silicon carbide body.

1 2. A process as in claim 1, wherein the carbon source is selected from
2 the group consisting of carbon black and colloidal graphite, and the silicon carbide comprises
3 alpha silicon carbide grit.

1 3. A process as in claim 1, wherein the ceramic slurry includes about 0
2 wt% to about 20 wt% carbon black, about 0 wt% to about 15 wt% colloidal graphite, about
3 40 wt% to about 90 wt% alpha silicon carbide grit, about 0.01 wt% to about 15 wt% organic
4 gelation agent and about 10 wt% to about 30 wt% liquid.

1 4. A process as in claim 1, wherein the organic gelation agent is selected
2 from a group consisting of corn starch, potato starch, tapioca starch, wheat starch, methyl-
3 cellulose, substituted derivatives of methyl-cellulose, carboxy-methyl-cellulose gum, guar
4 gum, sodium alginate, gum arabic, lignosulfonates, polyacrylates, polyvinyl-butyrals and
5 acrylics.

1 5. A process as in claim 1, wherein the ceramic slurry includes about
2 0.01 wt% to about 5 wt% potato starch as a gelation agent.

1 6. A process as in claim 1, further comprising heating the green body to a
2 temperature of about 1400°C to about 1650°C during siliconization.

1 7. A process as in claim 1, wherein siliconization comprises exposing the
2 green body to about 20 wt% to 150 wt% (based on green body weight) liquid silicon metal.

1 8. A process as in claim 1, wherein compacting the ceramic slurry
2 comprises forcing the ceramic slurry into a porous mold with a pore size of about 2 microns

3 to about 20 microns and applying pressure of about 70 psig to about 600 psig for about 10
4 seconds to about 240 seconds.

1 9. A process as in claim 1, further comprising agitating the ceramic slurry
2 continuously at low shear for about 4 hours to about 15 hours under vacuum conditions.

1 10. A process as in claim 1, wherein combining further comprises mixing
2 the ceramic slurry for about 10 minutes to about 60 minutes using a high shear, high intensity
3 mixer.

4 11. A process as in claim 1, further comprising drying the green body in a
5 conveyor drying oven at about 30 °C to about 200 °C for about 5 minutes to about 12
6 minutes.

7 12. A process as in claim 1, wherein the silicon carbide body comprises an
8 armor torso.

9 13. A reaction bonded silicon carbide body produced according to the
10 process of claim 1.

11 14. A body as in claim 13, wherein the silicon carbide body comprises an
12 armor torso.

1 15. A green body, comprising:
2 silicon carbide in a major amount;
3 a carbon source in a moderate amount;
4 an organic gelation agent in a minor amount;
5 and a liquid in a moderate amount.

1 16. A body as in claim 15, wherein the carbon source is selected from the
2 group consisting of carbon black and colloidal graphite, and the silicon carbide comprises
3 alpha silicon carbide grit.

4 17. A body as in claim 15, wherein the green body comprises about 5 wt%
5 to about 17 wt% carbon black, about 3 wt% to about 11 wt% colloidal graphite, about 60
6 wt% to about 86 wt% alpha silicon carbide grit, about 0.01 wt% to about 17 wt% organic
7 gelation agent and about 5 wt% to about 15 wt% liquid.

1 18. A body as in claim 15, wherein the organic gelation agent is selected
2 from a group consisting of corn starch, potato starch, tapioca starch, wheat starch, methyl-
3 cellulose, substituted derivatives of methyl-cellulose, carboxy-methyl-cellulose gum, guar
4 gum, sodium alginate, gum arabic, lignosulfonates, polyacrylates, polyvinyl-butyrls and
5 acrylics.

1 19. A body as in claim 18, wherein the green body comprises about
2 0.01 wt% to about 5 wt% potato starch as the organic gelation agent.

1 20. A ceramic slurry for producing a reaction bonded ceramic body, the
2 ceramic slurry comprising:

3 silicon carbide in a major amount;
4 a carbon source in a moderate amount;
5 an organic gelation agent in a minor amount; and
6 a liquid in a moderate amount.

7 21. A ceramic slurry as in claim 20, wherein the carbon source is selected
8 from the group consisting of carbon black and colloidal graphite, and the silicon carbide
9 comprises alpha silicon carbide grit

4 22. A ceramic slurry as in claim 20, wherein the slurry includes about
5 0 wt% to about 20 wt% carbon black, about 0 wt% to about 15 wt% colloidal graphite, about
6 40 wt% to about 90 wt% alpha silicon carbide grit, about 0.01 wt% to about 15 wt% organic
7 gelation agent and about 10 wt% to about 30 wt% liquid.

1 23. A ceramic slurry as in claim 20, wherein the organic gelation agent is
2 selected from the group consisting of corn starch, potato starch, tapioca starch, wheat starch,
3 methyl-cellulose, substituted derivatives of methyl-cellulose, carboxy-methyl-cellulose gum,
4 guar gum, sodium alginate, gum arabic, lignosulfonates, polyacrylates, polyvinyl-butyrls
5 and acrylics.

1 24. A ceramic slurry as in claim 23, wherein the ceramic slurry comprises
2 about 0.01 wt% to about 5 wt% potato starch as the organic gelation agent.